Appl. No. 10/783,797   PATENT
Amdt. dated May 31, 2006
Reply to Office Action of March 10, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings of claims in the application:

Listing of Claims:

1   Claim 1. (currently amended) A method for improving visual depiction of
2   animation splines in a computer assisted animation system, the method comprising:
3   producing a source spline formed of paths between a sequence of knots to define a
4   path between a first end knot and a second end knot;
5   displaying said the source spline on a computer display monitor of said the
6   computer assisted animation system wherein first axes represent time and second axes represent
7   distance;
8   analyzing said the source spline to designate pose knots and timing knots between
9   said the first and second end knots, wherein at least one timing knot is established between
10   successive pose knots;
11   thereafter producing a flipped spline wherein first second axes through said the
12   pose knots are reversed;
13   displaying said the flipped spline on the computer display monitor as a sawtooth
14   spline display for evaluation and to allow adjustment of said the source spline;
15   adjusting said the source spline to obtain smoother transitions adjust a trajectory
16   of the source spline between the first end knots and the second end knot; and
17   using said the source spline to produce an animation sequence.

1   Claim 2. (currently amended) The method according to claim 1 further including
2   the step of comprising:
3   upon inserting a new pose knot between two existing pose knots, causing all pose
4   knots following the new pose knot to flip so that the sawtooth spline display is preserved.

1   Claim 3. (canceled)

1   Claim 4. (currently amended) In a computer assisted animation system an

2 apparatus for improving visual depiction of animation splines comprising:

3   an input device operative to produce a source spline formed of paths between a

4 sequence of knots to define a path between a first end knot and a second end knot;

5   a display for displaying ~~said~~ the source spline on a computer display monitor of

6 ~~said~~ the computer assisted animation system, wherein first axes represent time and second axes

7 represent distance;

8   computer software operative to analyze ~~said~~ the source spline to designate pose

9 knots and timing knots between ~~said~~ the first and second end knots, wherein at least one timing

10 knot is established between successive pose knots;

11   computer software operative to produce a flipped spline wherein ~~first~~ second axe ;

12 through ~~said~~ the pose knots are reversed;

13   ~~said~~ the display operative to display ~~said~~ the flipped spline as a sawtooth spline

14 display for evaluation and to allow adjustment of ~~said~~ the source spline;

15   an input device operative for adjusting ~~said~~ the source spline to ~~obtain smoother~~

16 ~~transitions~~ adjust a trajectory of the source spline between the first end knots and the second end

17 knot; and

18   an output device operative to use ~~said~~ the source spline to produce an animation

19 sequence.

1   Claim 5. (new) The method of claim 1, wherein displaying comprises providing

2 an ascending display mode, wherein the second axes of at least one pose knot is displayed in a

3 first position, or a sawtooth display mode, wherein the second axes of the at least one pose knot

4 is rotated from the first position to a second position.

1   Claim 6. (new) The method of claim 1, wherein the second axes is a vertical

2 axes.

1   Claim 7. (new) The method of claim 1, wherein producing a flipped spline

2   comprises flipping a second axis of a last pose knot in a series of sequential pose knots having

3   identical knot values.

1   Claim 8. (new) The method of claim 1, wherein adjusting the source spline

2   comprises visually exaggerating source spline anomalies.

1   Claim 9. (new) The system of claim 4, wherein the second axes is a vertical

2   display axes.

1   Claim 10. (new) The system of claim 4, wherein the input device is operative to

2   provide a timing adjustment of the pose knots.

1   Claim 11. (new) The system of claim 4, wherein the display is operative to

2   exaggerate anomalies associated with the source spline.

1   Claim 12. (new) The system of claim 4, wherein the display is operative to

2   provide an ascending display of the source spline and a sawtooth display of the source spline.

1   Claim 13. (new) A computer system for manipulating a spline image on a

2 display, the system comprising:

3   at least one processor:

4   a computer readable storage medium coupled to the processor, wherein the

5 computer readable storage medium includes instructions stored therein for directing the

6 processor to manipulate the spline image, the instructions comprising:

7   code for directing the processor to determine a segmented path through a plurality

8 of knots to produce the spline image, wherein each of the plurality of knots include a first axis;

9   code for directing the processor to display the segmented path on the display;

10   code for directing the processor to receive a selection of one or more pose knots

11 from the plurality of knots from a user,

12   code for directing the processor to rotate the first axes of the selected pose knots

13 from a first state to a second state;

14   code for directing the processor to receive a selection of one or more timing knots

15 from the plurality of knots in response to input from a user, wherein the first axes of the timing

16 knots are fixed in the first state;

17   code for directing the processor to determine from the one or more selected pose

18 knots, and the one or more selected timing knots, a visually exaggerated spline image that

19 visually enhances anomalies associated with the segmented path of the spline image; and

20   code for directing the processor to display the visually exaggerated spline image

21 on the display to facilitate a user in detecting the anomalies.

22   Claim 14. (new) The system of claim 13, wherein the one or more pose knots

23 represent one or more poses of an animated object.

1   Claim 15. (new) The system of claim 13, wherein the one or more timing knots

2 represent timing between one or more poses of an animated object.

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1   Claim 16. (new) The system of claim 13, wherein code for rotating the first axes

2   comprises code for directing the processor to flip the first axes of the pose knots between a

3   horizontal position and a vertical position.

1   Claim 17. (new) The system of claim 13, further comprising code for directing

2   the processor to adjust the timing of one or more of the pose knots according to a user input.

1   Claim 18. (new) The system of claim 13, further comprising code for directing

2   the processor to alternate the plurality of knots in a sequence between the one or more pose kno.s

3   and the one or more timing knots to generate a sawtooth version of the spline image.

1   Claim 19. (new) The system of claim 13, further comprising code for directing

2   the processor to adjust the trajectory of a segment of the spline image according to a

3   modification to one or more of the pose knots.

1   Claim 20. (new) The system of claim 13, further comprising code for directing

2   the processor to generate an ascending view of the plurality of knots, wherein successive ones o

3   the pose knots are displayed further in distance as time is advanced.

1   Claim 21. (new) The system of claim 13, further comprising code for directing

2   the processor to generate a sawtooth view of the plurality of knots, wherein alternative ones of

3   the pose knots each having a first axis flipped to the second state are displayed to generate a

4   sawtooth version of the spline image.